

Name _____

Date _____

Chemistry AF

Periodic Properties Lab

Purpose

The purpose of this lab is to investigate the periodic trends of density and solubility.

Background

When the elements are arranged in order of increasing atomic number, they exhibit a periodic recurrence of properties. This fact led to the grouping of elements as seen in the periodic table. Elements in vertical columns of the periodic table form groups with similar physical and chemical properties. These similarities are due, in large part, to the fact that all the elements within a group have the same outer shell electron configuration. You can also find periodic trends in certain properties, such as density, among the elements within a given group. In addition, compounds that contain elements from the same group can display trends in properties such as solubility.

In this experiment, you will investigate the variation in density among group 14 elements and the solubility of salts of group 2 elements. You will use your results to predict the density of another group 14 element and identify an unknown group 2 element.

Procedure*Part A – Densities of group 14 elements*

1. Find the densities of carbon, silicon, tin, and lead. Use water displacement to find the volume of silicon, tin, and lead. Measure the length, width, and height to find the volume of carbon. **DO NOT GET THE CARBON WET.**
2. Organize your results in the data table.

	Mass	Volume	Density
Carbon			
Silicon			
Tin			
Lead			

Part B – Solubilities of salts of group 2 elements

1. Set up an overhead transparency like the data table below. Use 1-2 drops of each solution. Record your results (S = soluble, I = Insoluble) on the data table.

	SO ₄ ²⁻	CO ₃ ²⁻	CrO ₄ ²⁻
Mg ²⁺			
Ca ²⁺			
Sr ²⁺			
Ba ²⁺			
Unknown			

Questions and Conclusions (answer in complete sentences, on a separate sheet of paper)

1. Prepare a graph of density versus period number for carbon, silicon, tin, and lead. Be sure to include appropriate labels.
2. Based on your graph, predict the density of germanium. Compare your estimate with the accepted density of germanium (5.46 g/cm³). Calculate your percent error. What are some possible sources for this error?
3. Describe the relationship between the solubility of salts containing group 2 metal ions and their position within the group.
4. Can you determine the identity of the unknown group 2 ion? Why or why not? What is this ion?